

TEMPERATURE COMPENSATION ELEMENT FOR A CONNECTION UNIT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is the US National Stage of International Application No. PCT/DE2003/003288, filed October 2, 2003 and claims the benefit thereof. The International Application claims the benefits of German application No. 10314406.4, filed March 28, 2003, both applications are incorporated by reference herein in their entirety.

FIELD OF INVENTION

[0002] The invention relates to a temperature compensation element for a connection unit to which lines can be connected.

SUMMARY OF THE INVENTION

[0003] A connection unit in the form of a front-panel connector to which sensors or actors can be connected via lines is known from the Siemens catalog ST 70, page 4/114, 2003 edition. This front-panel connector can for example be plugged into a temperature measurement module to which thermal stress values from sensors can be fed via a number of input channels. To measure the temperature of a thermoelement as accurately as possible it is necessary to precisely record a comparison temperature at a measuring point in the vicinity of the connection terminal of the thermoelement. From this comparison temperature and the temperature of the thermoelement at the measuring point of the technical process to be controlled the absolute temperature at this measuring point is determined. As a result of the geometric expansion of the connection terminals on a multi-channel temperature measurement module the comparison temperature for each channel cannot be determined exactly since usually the module features only

one measurement point for recording the comparison temperature for all connection terminals. This leads to imprecise temperature measurements, in particular because the connection terminals are subjected to different thermal influences by components of the circuit board of the module.

[0004] The object of the present invention is to create a temperature compensation element for a connection unit of the type mentioned at the start of this document which minimizes a temperature gradient at the connection terminals of the connection unit.

[0005] This object is achieved by the claims.

[0006] In an embodiment of the invention the reduction of the temperature gradient at the connection terminals of the connection unit is increased.

[0007] In a further embodiment of the invention a temperature-dependent resistor is arranged on the strip. For the case in which the terminal lugs of the temperature compensation element are connected to the terminals of the connection unit, a suitable evaluation circuit of the connection unit can determine from the resistance value of the temperature-dependent resistor the exact comparison temperature for all terminals of the connection unit.

[0008] A further embodiment of the invention makes it possible to manufacture the temperature compensation element using simple methods. To manufacture two interconnected strips a right-angled copper plate which is appropriately folded is sufficient.

[0009] With reference to the drawing, in which an exemplary embodiment of the invention is illustrated, the invention, its embodiments and also its advantages are explained in

more detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

- Figure 1 shows a temperature compensation element viewed from above, and
- Figure 2 shows a side view of the temperature compensation element from Figure 1.

DETAILED DESCRIPTION OF INVENTION

[0010] In Figure 1 the number 1 indicates a temperature compensation element which includes a massive thermally-conductive strip 2, preferably a copper bar. Essentially at right angles to this strip are a series of electrically-conducting terminal lugs 3 pressed onto or glued onto the strip 2 in a row, with insulation material as thermally-conductive material being provided between the strip 2 and the terminal lugs 3 as well as between the individual terminal lugs 3. This means that the terminal lugs 3, which preferably also consist of copper, are electrically isolated from the strip 2 and from the other terminal lugs 3. The gap between the terminal lugs 3 arranged in a row is selected so that the terminal lugs 3 can be contacted in corresponding connection terminals of a front-panel connector of a process control module. This type of front-panel connector is for example known from DE 195 14 767 C1 or DE 19855245 195 14 768 C2. This front-panel connector can be plugged into a module and features connection terminals in the form of screw terminals to which process control lines connected to sensors can be attached.

[0011] To enable an exact comparison temperature for all connection terminals of the front-panel connector to be determined, the strip 2 is provided with a temperature-dependent resistor 4 of which the terminals 5 are connected to a terminal lug 3 in each case. For the case in which the

terminal lugs 3 are screwed to the connection terminals of the front-panel connector and the front-panel connector is plugged into a module, a suitable evaluation circuit of the module can determine the comparison temperature from the resistance value of the temperature-dependent resistor.

[0012] The text below refers to Figure 2 in which the temperature compensation element in accordance with Figure 1 is shown in a side view. To further reduce the temperature gradient at the connection terminals of the front-panel connector, temperature compensation element 1 features two thermally-conductive strips 2a, 2b connected to each other via a thermally-conductive connection piece 6. The strips 2a, 2b are each electrically isolated via an isolation strip 7a, 7b made of thermally-conduction material from the terminal lugs 3, to avoid short circuits between the terminal lugs 3 and the metallic strip 2.